Before the
Federal Communications Commission
Washington, D.C.

In the Matter of	)	
Schools and Libraries Universal Service Support Mechanism	)	CC Docket No. 02-6
Second Further Notice of Proposed Rule-Making	)	FCC 03-323

ON-TECH COMMENTS ON SECOND NOTICE OF PROPOSED RULEMAKING

Introduction

On-Tech (On-Tech), a technology consulting firm based in Red Bank, New Jersey, assists schools and libraries in navigating the E-Rate process. Although On-Tech represents a broad range of clients, our comments on the above-captioned matter (NPRM) will focus on the realities faced by our smaller clients[1] when they attempt to obtain E-Rate funding. In addition to the firm's significant experience working with the E-Rate program, Dan Riordan, president of On-Tech, is both an experienced network engineer and a former purchasing officer for the U.S. Government.

Comments

A. Discount Matrix

1. Incentive for 'Gold-plating' at High Discount Levels.

The Commission seeks comment on "changing the matrix to adjust the levels of discounts received by schools and libraries for service."[2] For reasons given below, On-Tech believes that altering the discount matrix wisely will result in a distribution of Priority 2 funds more consistent with regulatory goals as well as a reduction in waste, fraud and abuse.

On-Tech believes that the highest discount for Priority 2 funding should be reduced to 70%. While our general observation of the behavior of schools and libraries considering Priority 2 funding do not indicate that the prospect of an 80% discount induces applicants to add unnecessary telephone lines or T-1 circuits, our impression of sector practices regarding funding request for internal/on-premise connections is less positive. Our observations in the field, with

[1] On-Tech's smaller clients typically have 10-20 voice telephone lines and one T-1 data access circuit.
[2] NPRM ¶ 59.

the E-Rate and other technology funding sources, suggest that asking applicants to bear more than 25% of the cost of services or equipment introduces an additional degree of thrift into their bureaucracies' purchasing calculi which could serve to reduce the temptation faced by a district to 'gold-plate' its network, leaving more resources for other applicants which have never received Priority 2 funding. Technical staff, when offered a discount of 80% or 90%, expand their requests beyond what is necessary and cost-effective to what is desirable. A superintendent told that she can have $90,000 in network funding by spending $10,000 will naturally view the opportunity more ambitiously than one facing a $30,000 spend for $70,000 in funding.

On-Tech believes a similar 25% psychological border exists for unscrupulous service providers. Vendors are accustomed to reducing an offered price by 10% or so over the course of negotiating with a customer. At the program's 80 and 90% levels they can easily manipulate an offer to remove any economic barriers to the prospective client altogether, gutting the efficacy any 10% or 20% 'deductible' may have in inducing purchasing thrift or, for that matter, in exercising prudent oversight of a vendor charged with building a network. In On-Tech's estimation, when the funding opportunity drops to 70%, the non-discounted portion paid by the applicant makes collusion between applicant and service provider more difficult and creates sufficient incentive for the applicant to ensure the project is cost-effective.

The net effect of this incentive structure is that applicants qualifying for Priority 2 funding at the 80-90% levels are tempted to overbuild internal networks, exhausting funding before applicants only qualifying for lower level discounts are given any.

2. Proposed Discount Matrix

Given On-Tech's impressions of the market conveyed above, we propose that the Commission adopt a more conservative discount schedule for Priority 2 funding as indicated in **Figure 1** below.

NSLP Free or Reduced	Urban	Rural	Priority 2 Urban & Rural
Less than 1%	20%	25%	20%
1% to 19.49%	40%	50%	30%
19.5% to 34.49%	50%	60%	40%
34.5% to 49.49%	60%	70%	50%
49.5% to 74.49%	80%	80%	60%
75.5% to 100%	90%	90%	70%

Figure 1. Discount Matrix with Priority 2 funding as proposed by On-Tech.

B. Pro-rata Allocation

The Commission asks "should funds continue to be allocated…on a pro-rata basis."[3] On-Tech advises the Commission to allocate funding on a fully-funded basis only. That is, where the Schools and Libraries Division (SLD) concludes that it has sufficient funding for all requests at the 74% discount level, but without enough to fund all requests at the 73% level, then no requests from 73% applicants should be funded, and unused funds should be rolled over into the following funding year. In On-Tech's experience, pro-rata funding is usually of no use to applicants, since they have typically budgeted funds only equal to the non-discounted amount.

The Commission also seeks comment on "how the transition to a new discount matrix…should be implemented."[4] On-Tech believes that the new discount matrix should be

[3] NPRM ¶62
[4] NPRM ¶62

announced as soon as possible, so as to be made effective for Program Year 2005. If the new matrix cannot be published by September 1, 2004, implementation should be delayed until Program Year 2006, in order to give applicants a full set of rules before the application cycle begins. The more legitimate and substantive a district's need for telecommunications infrastructure, the more lead time it is likely to need to effectively use new infrastructure in a specific academic term.

On-Tech further asks that the Commission adopt and release program changes of *all* types at least 10 months prior to the start of the program year, and that the SLD be required to post new guidance at least 60 days before the opening of the "80-day window." For example, in response to the Third Report and Order, the Administrative Offices and Buildings Fact Sheet was pulled off the SLD Web site on November 18th and not replaced before the closing day for the Form 470, forcing applicants to begin the application process without knowing the rules.

C. Competitive Bidding Process

1. Simplified Application Process for Basic Telephone Service

The Commission seeks "comment on the current process of applying for discounted services."[5] On-Tech believes that the application process for basic telephone services should be eliminated. The current application process is a strong disincentive for smaller applicants with lower discounts, and has resulted in lower participation.

On-Tech proposes the following process for determining applicants' funding commitments:

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[5] NPRM ¶63.

1. 180 days before the start of the program year, schools and libraries who desire E-Rate funding for existing telecommunications services should be required to submit Letters of Authorization allowing the SLD to access their carrier billing records.
2. 120 days before the start of the funding year, the SLD should request billing information from the telecommunications providers for all eligible entities and determine the level of funding for a school or library based on the information received. The SLD should then determine the level of funding based on the billing records.
3. 60 days before the start of the funding year, the SLD should inform the school or library and the service provider of the amount approved for the following year.

There is no compelling need for any of the forms now used in the application process for an existing basic telephone service. On-Tech believes that Form 470 typically does not induce effective competition for these services. Interested vendors can be sure that all schools and libraries have telephone service. On the other hand, Form 470 does not supply sufficient information for providers to make an informed bid. If the SLD desires to encourage competition among carriers, it should consider posting an abstract of the billing information it receives under the process proposed above, giving vendors the information they need to make relevant proposals, then simplify and shorten the process for Operational SPIN Changes, so that carriers can compete at any time, and schools and libraries can lower their telecommunications costs at any time.

Nor does Form 471 provide useful information on services that began before the start of the Program Year for which there is no contract, and which will end after the end of the Program Year. The Item 21 attachments do provide useful information, but for basic telephone service, those attachments are photocopies of parts of phone bills. Under the process proposed above, the

SLD would have direct access to billing information, making the PIA's task would be much easier.

Further, the Form 486 serves no purpose for existing basic telephone service. The start date is obviously the first day of the Program Year, and CIPA compliance is not required.

The only paperwork required of applicants would be a certification at the end of the funding year that the applicant had paid the undiscounted amount indicated on service provider invoices to the USAC for that funding year.

In the case of cancellations or changes to service that significantly reduce the use of funding, the service provider should be required to inform the SLD, so that the funding commitment can be adjusted.

2. Elimination of Form 470

On-Tech believes that Form 470 serves not to lower costs, but to increase fraud. The Form 470 is not a good vehicle for promoting competition. In all the years On-Tech has guided its customers through the E-Rate process, Form 470 has never resulted in sufficient competition; On-Tech always expands the competition beyond the providers who respond to the 470. One of the services On-Tech offers its clients is to reduce their telecommunications costs by finding lower-cost carriers. On-Tech does not, however, attempt to mesh that process with the E-Rate application process, even though we are typically managing the E-Rate application process for the client as well: Instead, On-Tech clients complete the application process designating their existing carrier, and then request an operational SPIN change after choosing a new provider. The result is extra paperwork for everyone, and often cost-saving changes are delayed while the SPIN change is processed, but it allows much more flexibility in the selection process, which in the end means lower prices and better service for On-Tech's clients.

In addition, the Form 470 attracts providers offering "revenue opportunities" and "commissions" to those with access to the application process. In addition, On-Tech perceives that the Form 470 process encourages service providers to think of schools and libraries less as customers and more as gatekeepers to federal funding.

Smaller applicants generally do not have the technical staff necessary to properly create or evaluate bid proposals for technology enhancements. As a result, they have two prudent courses of action: pay an independent consultant to create and evaluate proposals, or consider proposals only from "trustworthy" vendors—vendors with a track record of serving other schools and libraries fairly. Since a consultant's fees are not justified for smaller projects, the only prudent choice is to rely on trustworthy vendors. The Form 470 process is of no use in identifying trustworthy vendors.

For larger projects, on the other hand, the RFP requirements of state purchasing laws are much more stringent than E-Rate rules. The Form 470 adds nothing to the process, and forces applicants to conduct the RFP inside the filing window, rather than at a time that is appropriate for project.

D. Definition of Internet Access

1. Rural Health Care Definition

The Commission seeks comment on whether it should amend its definition of Internet access in the schools context "to conform to the definition recently adopted for the rural health care mechanism."[6] The definition adopted was: "an information service that enables rural health care providers to post their own data, interact with stored data, generate new data, or communicate

[6] NPRM ¶ Ibid.

over the World Wide Web."[7] While the proposed definition is superior to the current definition, On-Tech believes that there are two areas of weakness.

First, the words "the World Wide Web" should be replaced by "the Internet." The definition above would render ineligible communication which does not depend on the World Wide Web, such as email.

Second, On-Tech believes that the phrase "interact with stored data" should be replaced with "access stored data." On-Tech is concerned the word "interact" would lead to discounts on Web-based administrative applications. Increasingly, student management, fiscal management, library catalog and other applications are migrating to Web-based applications. Applicants will seek to have these applications subsidized by the E-Rate: On-Tech has already been asked by applicants and service providers about the applicability of E-Rate discounts to funding for such applications, because they are hosted on the Web, and Web hosting is now eligible. While perfectly legitimate and perhaps even preferable to customers for various reasons, On-Tech does not believe that the finite pool of funds supporting E-Rate discounts were intended for such uses.

More generally, the rules should be very clear on which parts, if any, of a Web-based application are eligible for discount. A typical Web-based application uses a three-tiered architecture. The first tier comprises Web servers, while the servers on the second tier handle the business logic; the only purpose of these two tiers is to allow users to "interact with stored data." The third tier comprises database servers, whose primary function is to allow users to "interact with stored data" on the disk subsystem, but because much of the data is stored in the database servers' memory and the disk subsystems may be part of the servers, their eligibility is less clear. Since two of the three tiers serve only to enable users to "interact with stored data," applicants

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will be able to use cost allocation to fund online applications through the E-Rate. Under the current rules, it is unclear whether applicants can use cost allocation to pay for the first tier of a Web-based application.

2. Virtual Private Networks

As mentioned,[8] support has not been provided for virtual private networks (VPNs) under current rules. VPN service should be eligible as Internet Access, and VPN hardware and server software used at eligible locations should be eligible as Internal Connections. VPN client software on end user machines should not be eligible. VPNs are often the most cost-effective way to link to buildings, and the exclusion of VPNs from the E-Rate program gives applicants incentive to choose a WAN architecture that is less cost-effective. In addition, VPNs are a cost-effective method for securing wireless LANs (WLANs). If VPNs are not eligible, applicants have incentive to choose a less cost-effective means of securing WLANs.

3. Caching vs. Storage

On-Tech suggests one further change to the eligibility rules for Internet access. Caching service should be eligible under Internet Access, and caching devices should be eligible under Internal Connections. Caching, the temporary storage of information during transmission, is a part of the most cost-effective architecture for Internet access. Caching reduces costs and increases speed. Some devices which use caching are now eligible: routers and switches, for example, store packets before forwarding them. Storage devices should continue to be ineligible, but a distinction should be made between devices that store information as needed for efficient transmission, and devices that store information for end user access.

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[8] NPRM ¶70

E. Wide Area Networks

1. Priority One Equipment

The Commission seeks "comment on whether to refine a standard for determining whether expenditures that subsidize infrastructure investment, either on-premises or off-premises, may properly be viewed as Priority One services."[9] The "on-premise Priority One equipment" loophole encourages applicants to engineer solutions that are not the most cost-effective in order to have equipment discounted under the E-Rate. The loophole should be tightened in two ways.

First, the minimum period for capital recovery of any amount should be extended to five years. Five years is a normal period of cost recovery in wide area network (WAN) projects, and an informal poll of WAN professionals suggests that this requirement will not discourage service providers from bidding on a project, as long as the cost of financing is paid by the applicant. The cost of financing should be eligible for E-Rate discount. Since the Commission is requiring applicants and service providers to commit to a five-year contract, the SLD should commit to provide funding for five years. Loss of funding in the midst of such a lease would cause hardship for both service provider and applicant. However, multi-year funding commitments should only be granted in cases where multi-year contracts are required under program rules.

Second, capital recovery should be spread over five years, regardless of the amount. Even at lower levels well below $500,000, the ability to have immediate capital recovery encourages applicants to pay for equipment without owning it. For applicants not able to receive Priority 2 funding, the current rules provide incentive for applicants to have their ISP buy all

[9] NPRM ¶74

routers, firewalls and eligible servers, install them at their location, then charge them full price as a capital recovery charge.

The Eligible Services List should make clear that "installation" charges include only service, not equipment. Some service providers charge a very high installation fee, where it is clear that most of that fee covers the cost of on-premise equipment. As the "on-premise Priority One equipment" loophole tightens, the "installation" loophole will become an attractive alternative.

The Commission seeks comment on limiting the discounts for upfront capital recovery costs. As stated above, all capital recovery costs should be amortized. If, however, the Commission continues to allow upfront capital recovery, On-Tech suggests that the limit should be 10% of the total cost of the contract. Limiting the upfront capital recovery cost to a percentage of the total contract cost would remove the incentive to manipulate lease terms in order to increase upfront payments. If the cap on capital recovery is based on annual cost, service providers have incentive to seek shorter leases, since stretching the length of the lease reduces the cost per year, which reduces the amount of upfront capital recovery allowed. (See Appendix A for an example.) Service providers could also increase their upfront recovery charge by constructing a lease which has higher monthly payments in the first year.

The Commission should also make clear whether applicants are to include the monthly capital recovery charges as well as one-time capital costs when determining whether their project requires amortization of capital costs.

2. Dark Fiber

The Commission seeks "comment on the provision of funding for unlit (dark) fiber."[10] On-Tech believes that dark fiber should be eligible. In many cases, it is the most cost-effective WAN solution.

The Commission further seeks comment on limiting discounts on a dark fiber buildout when the applicant is not utilizing the full capacity of the network. Discounts should not be limited based on utilization. Requiring that applicants demonstrate full utilization of WAN links, regardless of the technology chosen, will substantially increase the complexity of the application process. In the particular case of a fiber lease, applicants should be able to install a WAN that will ensure that their needs are met through the end of the lease. Given the rapid growth of bandwidth consumption, applicants should be able to build a dark fiber network which significantly exceeds their current needs. Installing fiber only as needed would be a waste of program funds.

F. Recovery of Funds

The Commission seeks comment on adopting specific rules for recovery of funds in case of: 1) violation of statutory requirements, 2) violation of programmatic rules and regulations, and 3) waste, fraud and abuse.[11]

While the Commission must adjust commitments and seek repayment of any disbursements which violate the Act, in cases of programmatic rules, the procedures should be more lenient. Commitments should be adjusted to remove any ineligible services. However, recovery of funds for services already provided will cause hardship for both service providers

[10] NPRM ¶77
[11] NPRM ¶81

and applicants. If the SLD approves a funding request, the service provider and applicant should not later be punished if that approval is later found to have been in error.

In cases of waste, fraud or abuse, the USAC should seek reimbursement from the entity responsible for the waste, fraud or abuse. In cases where both the applicant and service provider are responsible, funds should be recovered from the party which finally received the funds, which will usually be the applicant.

The Commission asks "whether there are any circumstances under which recovery would be more appropriately sought from a school or library applicant."[12] In general, recovery should be sought from service providers, because disbursements are made to service providers. In addition, service providers are better able to determine if a service is eligible and if the service provider is eligible to provide telecommunications services, the two circumstances cited in the NPRM as requiring recovery. [13]

There are two circumstances where funds should be recovered from an applicant. The first is mentioned above: an applicant is found to have engaged in waste, fraud or abuse. The second is the case where an applicant purchased equipment for an eligible purpose and subsequently used the equipment for an ineligible purpose. In such cases, the applicant should be required to either: 1) stop using the equipment for ineligible purposes, or 2) repay the discount on the remaining value of that equipment. The remaining value should be calculated using the SLD procedure for determining the trade-in value for equipment.[14]

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[12] NPRM ¶81
[13] NPRM Footnote 164
[14] See Question 2 at http://www.sl.universalservice.org/reference/EPSFAQ-f.asp

The Commission invites comments on whether recovery should be waived if the dollars at issue are *de minimus*.[15] Any commitment adjustment that does not involve waste, fraud or abuse and is less than the greater of $25,000 or 1% of the total for the funding request should be considered *de minimus*, and recovery waived. Recovery should always be pursued in cases of waste, fraud or abuse.

The Commission seeks comment "on whether any applicant that has previously been subject to a commitment adjustment proceeding should be subjected to more rigorous scrutiny before receiving commitments in the future."[16] If the commitment adjustment was the result of waste, fraud or abuse, the entire application and reimbursement process for all future applications involving the entity or entities responsible for the waste, fraud or abuse should be audited by an impartial third party. The applicant and/or service provider should be required to hire an independent consultant to audit their applications and their use of E-Rate funding. If, however, a commitment adjustment is the result of an error, there should be no increased scrutiny. If a pattern of serious errors by an applicant or service provider is detected, whether the errors were corrected by the PIA or by a commitment adjustment, the SLD should again require an independent audit of any applications involving that applicant or service provider.

G. Other Actions to Reduce Waste Fraud and Abuse

1. Cost-Effective Funding Requests

The Commission could eliminate waste by requiring applicants to focus on the total cost of ownership rather than purchase price when selecting a bid. Requiring applicants to use purchase price as the primary factor in selecting equipment does not lead to cost-effective

[15] NPRM ¶82
[16] NPRM ¶84

purchases. The examples in Appendix B show that purchase price accounts for only 14 to 44 percent of the total cost of ownership for servers. The purchase price of buying a networking device typically accounts for only 5% to 15% of the total cost of ownership.[17] Since purchase price is not the primary factor in cost-effectiveness, it should not be the primary factor in selecting bids.

2. Funding Benchmarks

The Commission asks: "Would it be beneficial and administratively feasible to develop … a benchmark or formula for 'cost-effective' funding requests, such as a specified dollar amount per student or per library patron for specified types of service?"[18] The SLD could certainly establish a "per student" benchmark for telecommunications and Internet access funding requests. Appendix C shows an analysis of funding requests by public school districts for the state of NJ, showing that while some districts request up to $600 per student, the majority of districts spend less than $50, and 95% of schools spend less than $120. The data suggest that funding is not distributed equitably, since a few districts receive many times the funding of the majority of districts.

On-Tech suggests that the Commission annually conduct similar analysis of funding requests by all applicants, and determine a maximum spending level for the following year. If the data from other states follows the pattern observed in Appendix C, On-Tech suggests the total annual per-student or per-patron pre-discount amount for each applicant should be limited to the pre-discount amount of the 90th percentile of their peers or twice the median spending level, whichever is greater.

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[17] http://www.computerworld.com/networkingtopics/networking/story/0,10801,76505,00.html
[18] NPRM ¶87

As with all changes, the maximum per-student or per-patron spending level should be published on the SLD Web site at least 60 days before the start of the "80-day window," so that applicants will know the limit before they begin the application process

3. Consultants and Outside Experts.

Applicant technology plans should identify all parties involved in creating the technology plan and Form 470, including any consultants or outside experts. An item should be added to the Form 470 identifying everyone involved in creating the Form 470. The form should include a certification that all contributors are listed and none of the contributors has a conflict of interest.

The SLD should publish on their Web site a registry of E-Rate consultants. The registry should include a disclosure any income a consultant received from service providers within the last year.

4. Technology Plans.

The Commission seeks comment on revising its rules regarding technology plans.[19] On-Tech believes there should be several changes in the rules regarding technology plans.

First, the Commission should clarify the technology plan requirements. More stringent requirements for technology plans were mentioned at the "Train-the-trainer" workshop and have been confirmed by the Help Desk, but the guidance on the SLD Web site has not changed. The Commission should direct the SLD to post all technology plan requirements clearly on the SLD Web site.

Second, service providers should not be prohibited from contributing to technology plans. Many applicants rely (quite correctly) on service providers to supply network descriptions and

[19] NPRM ¶94

schemas for their plans, and budgets for the technology plan cannot be developed without price information from service providers. In addition, applicants should involve board and community members with a background in technology in the technology planning process, and those community members often work for service providers.

Third, applicants should not be required to have a technology plan written before submitting the Form 470. According to the SLD Web site[20], "a technology plan should be responsive to…opportunities, open to revision, and not a static document." However, the SLD is requiring that technology plans be written eight months before they are implemented, making them static for eight months of the year. This requirement is at odds with flexibility and responsiveness in planning.

Fourth, the requirement that all items beyond local phone service be listed as line items in the technology plan budget is onerous and should be removed. A technology plan should describe how educational goals will be supported by technology, not which features will be associated with a particular phone line. A plan should have a mission, goals and objectives, not the price of an ISDN line. The budget in a technology plan should only contain benchmarks for each budget area. It should not contain specific line items; that level of specificity should be part of the applicant's budget process.

The Commission asks, "Should we require that, as part of the technology plan process, applicants analyze the cost of leasing versus purchasing E-Rate eligible products and services?"[21] As stated above, technology plans should describe how technology will support the applicant's

[20] http://www.sl.universalservice.org/apply/step2.asp#2ii
[21] NPRM ¶94

educations goals, not how they are to be purchased. The cost-effectiveness of various types of financing should be conducted as close to the time of purchase as possible.

The Commission asks, "Should we require the applicant to consider the most cost-effective way to meet its educational objectives?"[22] The Commission should take steps to help applicants find the most cost-effective solution. 1) Change the requirement that price be the primary factor in all purchases, since the most cost-effective solution does not always have the lowest purchase price. 2) Post service providers' price lists on the SLD Web site. 3) Post a searchable database of Item 21 attachments on the SLD Web site to allow applicants to see what solutions other applicants have used, who supplied the solution, and how much the solution cost.

Posting Item 21 attachments also has the potential to reduce waste, fraud and abuse and increase competition by opening funding requests to peer review. Inappropriate charges could be identified by others looking at the attachments. Vendors could examine the details of a funding request, propose a more cost-effective solution, and reduce the cost of a funding request through an Operational SPIN Change.

H. Miscellaneous

1. Priority for Applicants that Have Not Achieved Connectivity.

Creating a sub-category of applicants for Priority 2 funding would add unnecessary complexity. In Program Year 2003, all applicants with more than 50% of students eligible for free or reduced lunch will receive Priority 2 funding. As restrictions on Priority 2 funding are increased, funding will continue to be available for those applicants.

[22] NPRM ¶94

Conclusion

On-Tech thanks the Commission for the opportunity to comment on the proposed changes to the rules. On-Tech is also grateful for the Commission's efforts to distribute the program's funds equitably and maintain consistency in the program rules.

Respectfully submitted,

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Appendix A

Capital Recovery in WAN leases

The hypothetical WAN lease demonstrates the effect of lease length on the amount of upfront capital recovery allowed if the maximum is 25% of annual cost.

Assumptions

Total capital costs:	$1,200,000
Monthly maintenance and fees:	$2,000
Finance rate (per year):	6%

5-Year Lease:

Lease Period (in months)	60
Monthly cost recovery:	$23,199
Monthly maintenance and fees:	$2,000
Total monthly cost:	$25,199
Annual cost without capital recovery:	$302,392
Allowable upfront capital recovery: (at 25% of total annual cost)	$100,797

10-Year Lease

Lease Period (in months)	120
Monthly cost recovery:	$13,322
Monthly maintenance and fees:	$2,000
Total monthly cost:	$15,322
Annual cost without capital recovery:	$183,870
Allowable upfront capital recovery:	$61,290

Appendix B

Total Cost of Ownership

Microsoft Exchange E-Mail Server

Data from:
http://www.microsoft.com/exchange/evaluation/TotalCost.asp

Exchange 2003 Messaging and Collaboration Costs	**Year 1**	**Year 2**	**Year 3**	**Total**	**% of Total**
Messaging & Collaboration Acquisition Cost per User	$59.29	N/A	N/A	$59.29	18%
Messaging & Collaboration Maintenance Cost per User	N/A	$14.82	$14.82	$29.64	9%
Administration Cost per User	$22.17	$22.17	$22.17	$66.51	21%
Migration & Upgrades Cost per User	$5.70	$5.70	$5.70	$17.10	5%
Storage Cost per User	$10.50	$10.50	$10.50	$31.50	10%
Downtime Cost per User	$36.81	$36.81	$36.81	$110.43	34%
Training Cost per User	$2.20	$2.20	$2.20	$6.60	2%
Messaging and Collaboration TCO per User/ Year	**$136.67**	**$92.20**	**$92.20**	**$321.07**	

Microsoft Windows 2000 and Linux Web server

Data from
http://www.microsoft.com/windows2000/docs/TCO.pdf

Cost Factor	**Microsoft**	**% of total**	**Linux**	**% of total**
Hardware	$ 7,087.00	21.9%	$ 3,006.00	9.8%
Software	$ 7,107.00	22.0%	$ 1,390.00	4.5%
Staffing	$15,102.00	46.7%	$23,015.00	75.2%
Downtime	$ 1,646.00	5.1%	$ 1,541.00	5.0%
IT staff training	$ 1,304.00	4.0%	$ 1,584.00	5.2%
Outsourced	$ 59.00	0.2%	$ 64.00	0.2%
Total	$32,305.00		$30,600.00	

Appendix C

Priority One Spending Per Student in New Jersey

The tables and charts below show the dollars spent per student per year on services discounted under the E-Rate program by public school districts in the state of New Jersey. The left column includes data for all funding years; each district receives one "entry" for each year it was funded. The right column uses only Program Year 2003 data. The left column is based on a wider range of data, but the right column gives a better idea of current spending.

The data indicate that two thirds of the districts in NJ spent less than $50 per student in 2003 on Telecommunications Services and Internet Access, while 90% spent less than $90.

Note: Some rows of data have been omitted from the tables to save space, but the data are included in the charts.

$ Per Student	Entries	Running Total	% Included
0-10	129	129	6.71%
10-20	225	354	18.42%
20-30	402	756	39.33%
30-40	375	1131	58.84%
40-50	268	1399	72.79%
50-60	178	1577	82.05%
60-70	102	1679	87.36%
70-80	60	1739	90.48%
80-90	31	1770	92.09%
90-100	33	1803	93.81%
100-110	13	1816	94.48%
110-120	15	1831	95.27%
120-130	11	1842	95.84%
Data omitted			
300-310	1	1903	99.01%
Data omitted			
3440-3450	1	1922	100.00%

$ Per Student	Districts	Running Total	Percent Included
0-10	5	5	1.37%
10-20	20	25	6.87%
20-30	62	87	23.90%
30-40	82	169	46.43%
40-50	74	243	66.76%
50-60	38	281	77.20%
60-70	29	310	85.16%
70-80	14	324	89.01%
80-90	7	331	90.93%
90-100	9	340	93.41%
100-110	4	344	94.51%
110-120	2	346	95.05%
Data omitted			
260-270	1	361	99.18%
400-410	1	362	99.45%
530-540	1	363	99.73%
600-610	1	364	100.00%